Driving Down HB-LED Costs (Part 2): Advanced Chemistry Models for MOCVD Reactor Design/Optimization

Project title:
Driving Down HB-LED Costs: Implementation of Process Simulation Tools and Temperature Control for High Yield MOCVD Growth

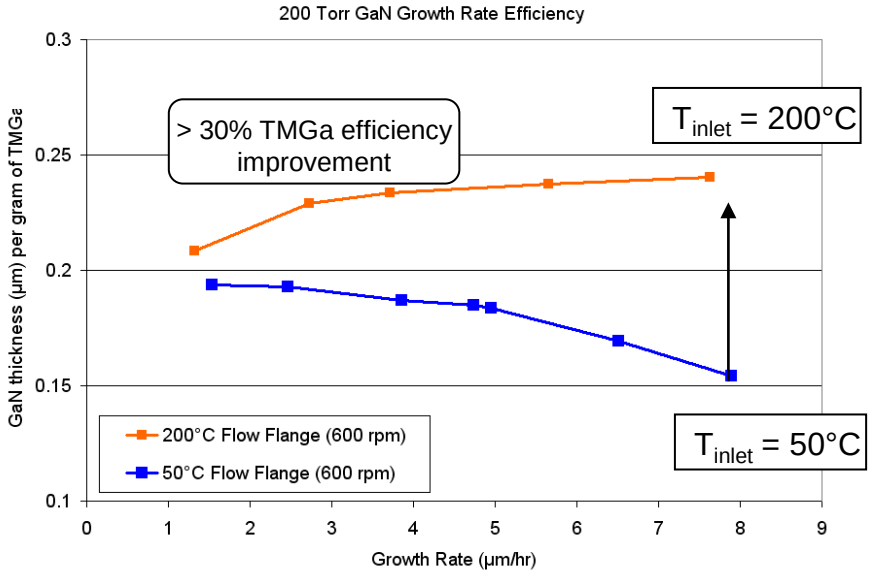
Team Members:
Veeco Instruments, Sandia National Laboratories, Philips Lumileds

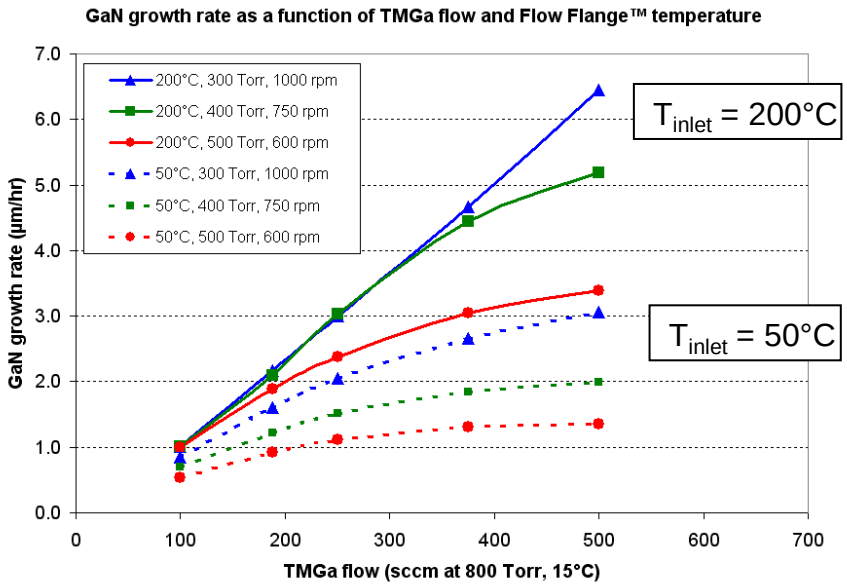
Overall Goal:
Reduce LED cost by 4x through increased MOCVD growth yield, improved efficiency, and better productivity

Manufacturing R&D MYPP targets:
A4.4 Manufacturing simulation; B4.1 Yield manufacturability;
B4.2 Epitaxial growth; B4.3 Manufacturing tools

Heated Flow Flange
GaN Growth Source Efficiency

At a gas inlet temperature of 200°C, metal organic efficiency increases by more than 30% at high growth rates of GaN





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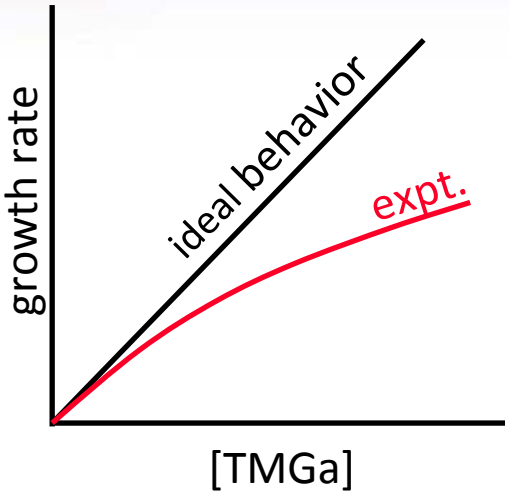
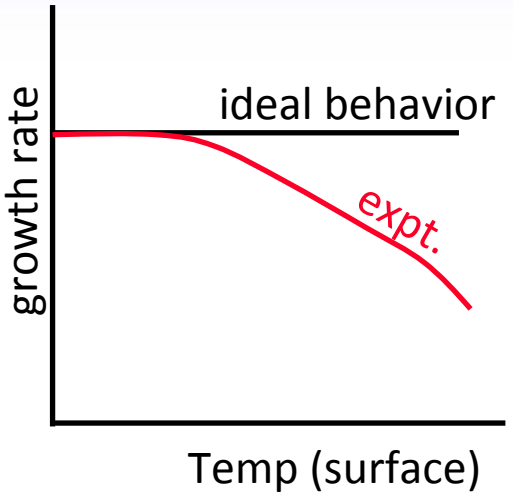
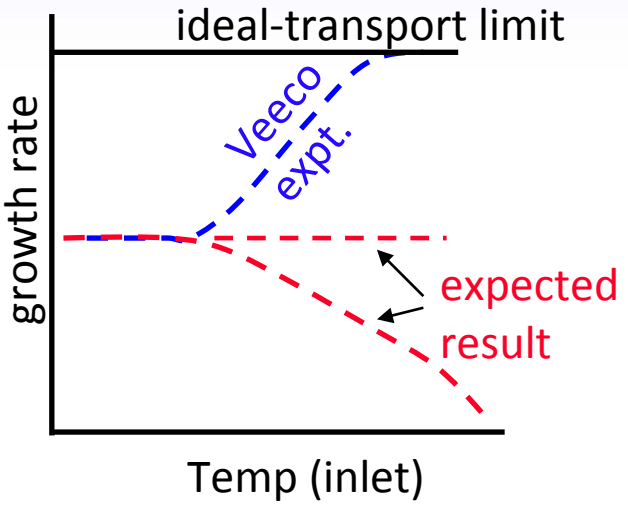
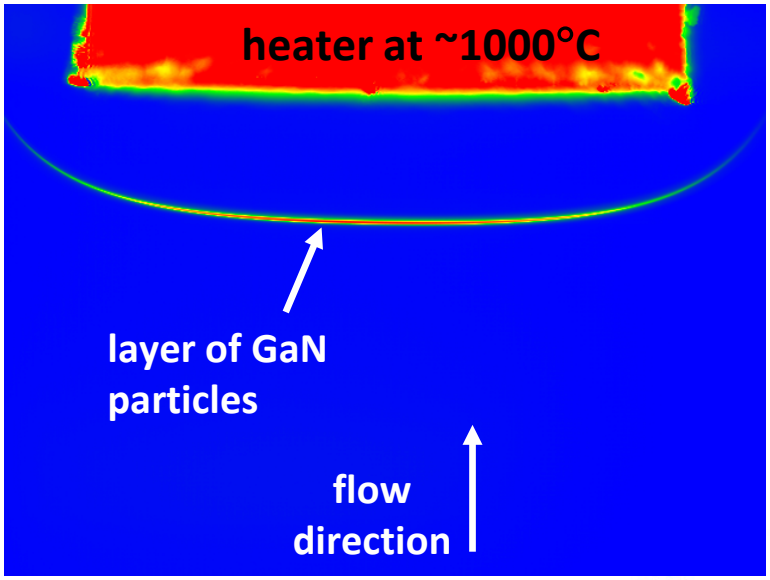
Growth Rates Dominated by Gas-Phase Particle Chemistry









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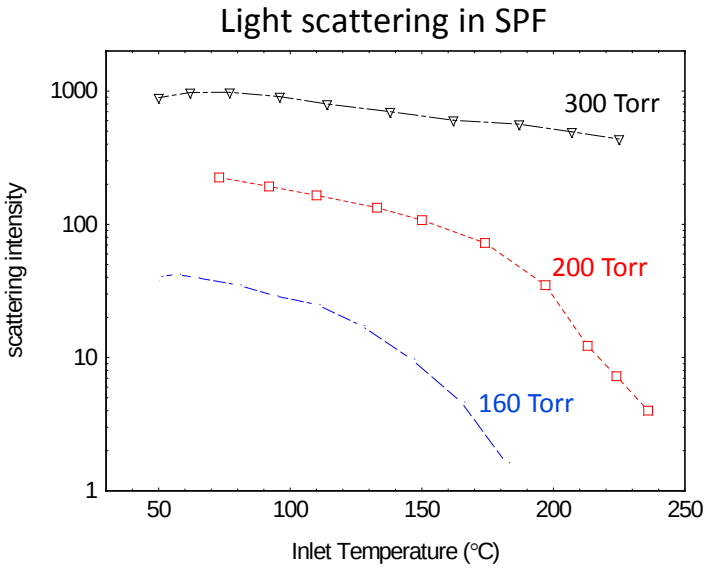
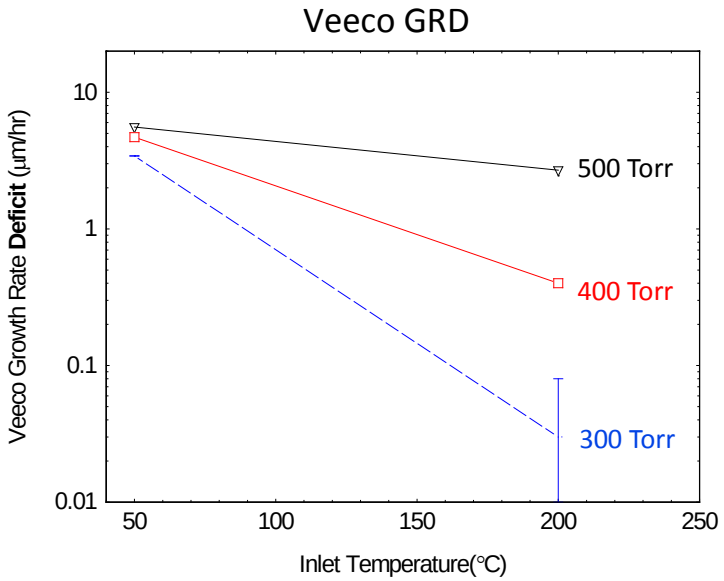
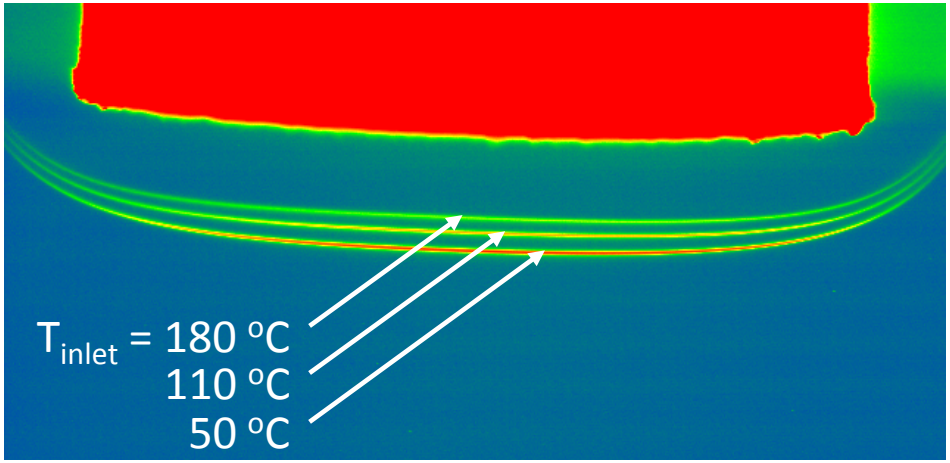
Particle Formation Explains MOCVD Growth Rate Behavior







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